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PEDESTRIAN CROSSING PRACTICE

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PEDESTRIAN CROSSING PRACTICE

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PEDESTRIAN CROSSING PRACTICE

INTRODUCTION

This "Pedestrian Crossing Practice" is supplemental to the Motor Vehicle Act and Regulations Pursuant to that Act. It is recommended that these Practices be followed; however, unlike the Act and Regulations, the guidelines are not mandatory for crossings on streets under Municipal jurisdiction.

Throughout the document, the words "shall", "should", and "may" are used to describe specific conditions related to crossing installations. To clarify the meanings intended by the use of these words, the following definitions apply:

SHALL: A mandatory condition as outlined in the Motor Vehicle Act or Regulations Pursuant to the Act.

SHOULD: An advisory condition. Where the word "should" is used, it is considered to be advisable usage, strongly recommended but not mandatory under the Motor Vehicle Act.

MAY: A permissive condition. An optional requirement which is not mandatory under the Motor Vehicle Act.

A crosswalk is that part of the roadway used to channel pedestrian traffic across it. In determining the type of crosswalk most suited to a particular crossing location, a number of factors should be considered. These include: pedestrian volume, pedestrian age and agility, roadway width, vehicle volume and speed, visibility conditions, and the proximity of adjacent traffic control.

A marked crosswalk should always be indicated by both pavement markings and either signs or pedestrian signals. Pavement markings should not be used alone to indicate a pedestrian crossing. Similarly, crosswalk signs or pedestrian signals should always be supplemented by pavement markings.

The recommended pavement marking for crosswalks which have no signal controls is the zebra style with longitudinal stripes which are more visible to approaching drivers. Twin parallel line type crosswalks are only suitable at intersections that are fully signalized for the purpose of controlling and regulating vehicular movements.

Crosswalks with zebra markings are wider than might be required to simply accommodate pedestrians walking abreast, as the longitudinal markings have to be seen and recognized by the approaching drivers, at the small angle of projection from the stopping sight distance.

This leads to the zebra markings (Figure No. 1) consisting of a series of equally spaced longitudinal markings, parallel to the centreline of the roadway, with a recommended stripe and spacing width of 60 cm. The recommended length of the markings is a minimum of 3.0 m where posted speed limits are 60 km/h or less and a minimum of 4.0 m where the speed limits are 70 km/h and greater.

Stop bars are not necessary at pedestrian crossings except where the approach is controlled by means of a signal or a STOP sign.

The twin parallel line crosswalk, consists of two parallel solid lines (30 cm wide) painted across the entire pavement width, either oriented to connect the sidewalks from the cross streets, or perpendicular to the centreline of the roadway. The width between lines is usually determined by the width of the cross street sidewalk(s) or the volumes of pedestrians crossing. The recommended minimum is 2.5 m. The line on the intersection side should be set back at least 60 cm from the projected edge of the cross street roadway.

The zebra markings should be used for all crosswalks installed on roads under the jurisdiction of the Ministry of Transportation and Highways. However, Municipalities may choose to use the twin parallel line markings for unsignalized crossings on roads under their sole jurisdiction.

Alpha-numeric identification codes for signs referenced in these guidelines have been taken from the Manual of Uniform Traffic Control Devices for Canada.

For these Guidelines, a through lane is defined as a lane which continues through an intersection. Additional auxiliary lanes (turn lanes) may be present.

> School patrols or adult crossing guards are recommended when most children encounter some difficulty crossing the roadway. These values are addressed in Appendix "A" beginning on page 14.

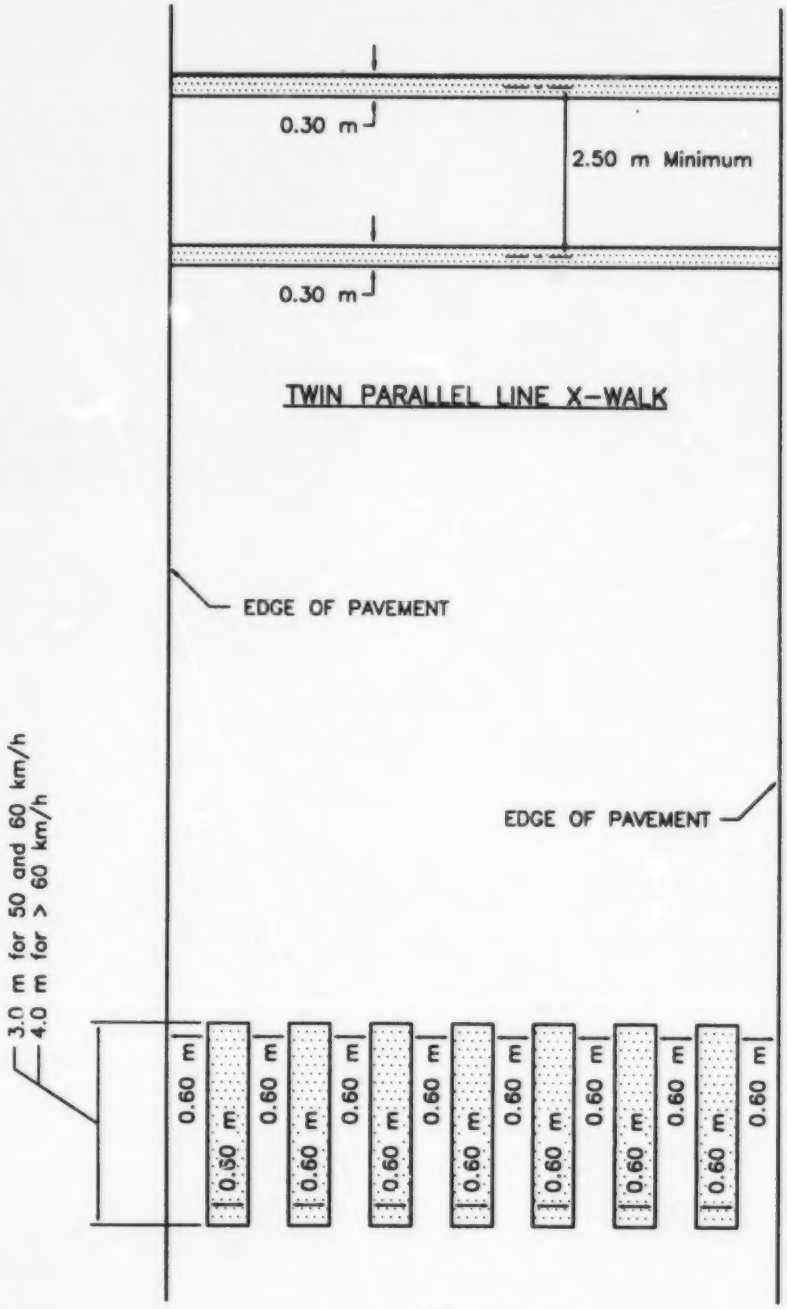


FIGURE 1
CROSSWALK PAVEMENT MARKINGS

1.0 PEDESTRIAN CROSSWALK WITH SIDE-MOUNTED SIGNS

1.1 Application Guidelines

This type of crosswalk could be considered the "standard crosswalk". It should be used when:

a) The crosswalk is not associated with a school route in those jurisdictions which differentiate between pedestrian and school crosswalks.

b) The roadway is not wider than one through lane in each direction or not more than two through lanes if the road is one-way.

It should not be used when:

a) The roadway has a speed limit greater than 60 km/h, or when there are more than 700 vehicles in the peak hour on a two lane road.

b) The roadway has restricted sight distance to side-mounted signs.

c) It is expected to serve elderly or handicapped pedestrians who require longer crossing times, and the roadway is wider than one through lane in each direction or more than two through lanes for one-way.

d) The crossing is mid-block.

1.2 Description of Installation (Figure No. 2)

a) The appropriate pavement marking is the zebra style crosswalk as described and defined in the Introduction.

b) Post-mounted Pedestrian Crosswalk (RA-4) signs shall be placed on each side of the roadway so that the motorist will face one sign on the right side of the roadway and one on the left side of the roadway. These signs show a single pedestrian symbol in black on a white background, and shall be a minimum size of 60 cm x 75 cm. The pedestrian symbol on the sign shall be oriented to face across the roadway (RA-4L and RA-4R signs are available).

1.2 Description of Installation (Figure No. 2)(Continued)

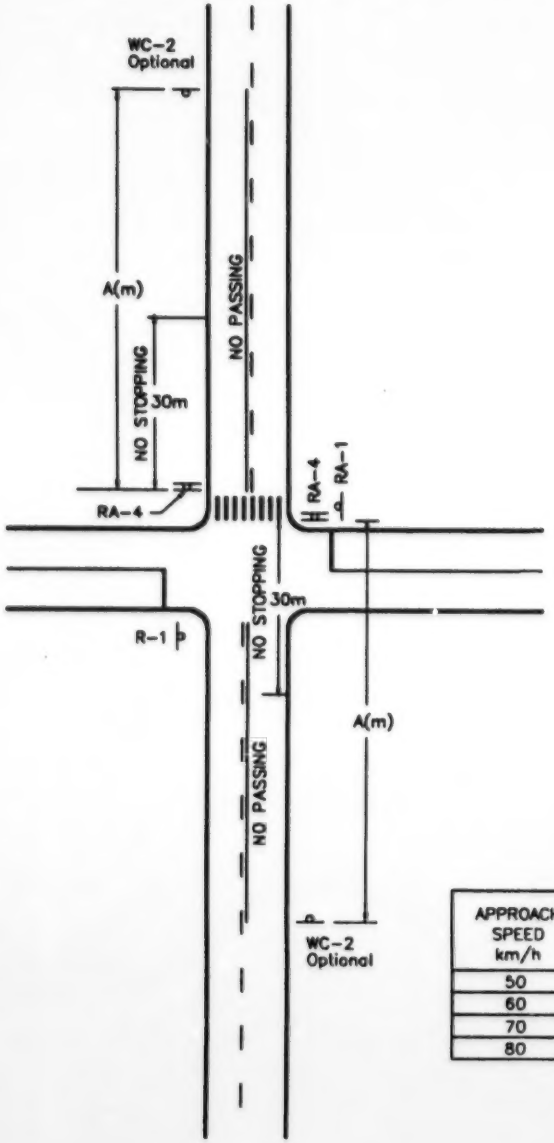
c) Stopping should be prohibited for a minimum of 30 m on the approaches to the crosswalk.

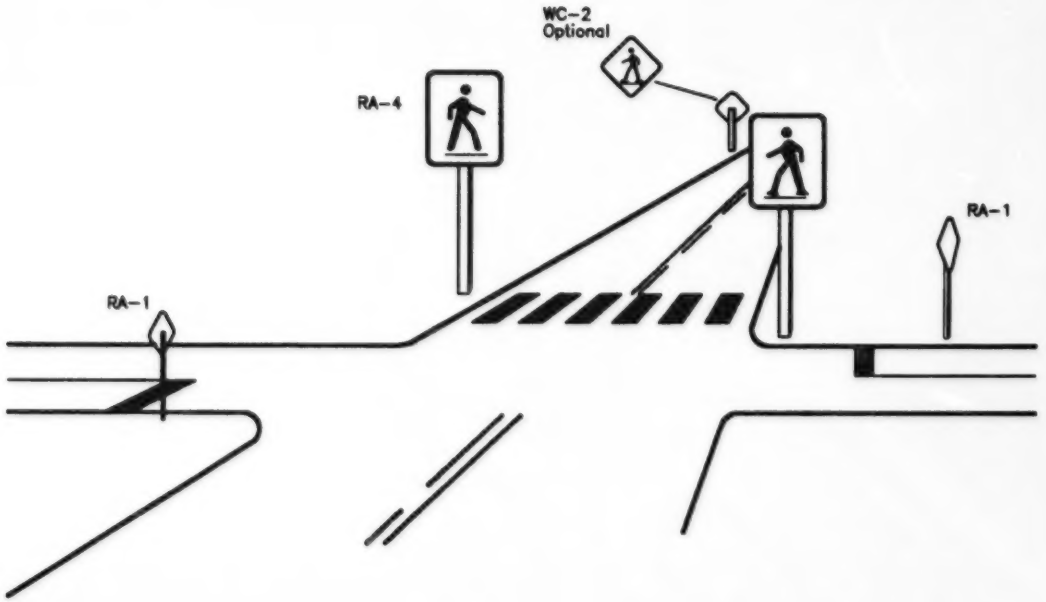
d) Crosswalk visibility should be maximized through location, parking restrictions and vegetation control. Where there is minimum visibility of the crosswalk area, a Pedestrian Crosswalk Ahead sign (WC-2 black-on-yellow warning sign) may be installed in advance of the crosswalk. The symbol of the pedestrian on the sign shall be oriented to face towards the roadway. The recommended distance between the crosswalk and the sign depends on approach speed.

e) On a single lane approach, a passing restriction should be implemented for traffic approaching a crosswalk. Generally, a solid yellow line pavement marking that prohibits passing is adequate and additional signing is not necessary. The recommended length for the passing restriction is dependent on the approach speed.

f) On multi-lane approaches, solid, white lane lines should be installed on each approach to the crosswalk in order to prohibit lane changing. The recommended length of the solid line is 30 m.

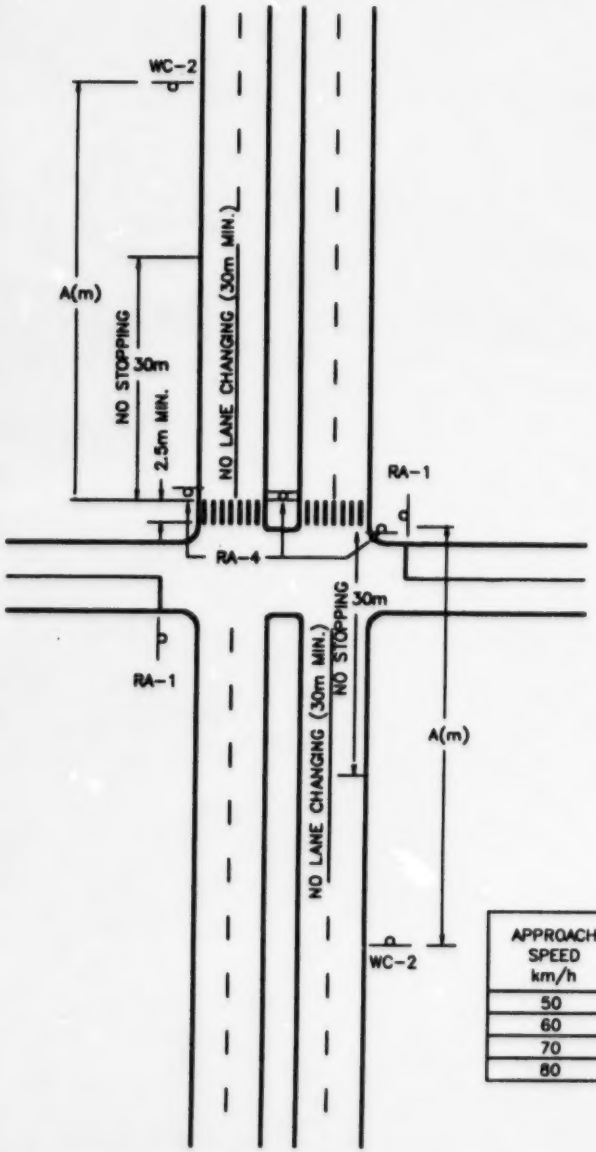
g) Where there is a raised median 2.0 m or more in width, such as at some mid-block locations, post-mounted pedestrian crosswalks signs for each approach should be placed on the right side of the roadway and in the median. Thus, the left side sign in Figure No. 2 is replaced by a median-mounted sign. The pedestrian symbols on the signs should be oriented to face across the approach roadway. See Figure No. 2A.

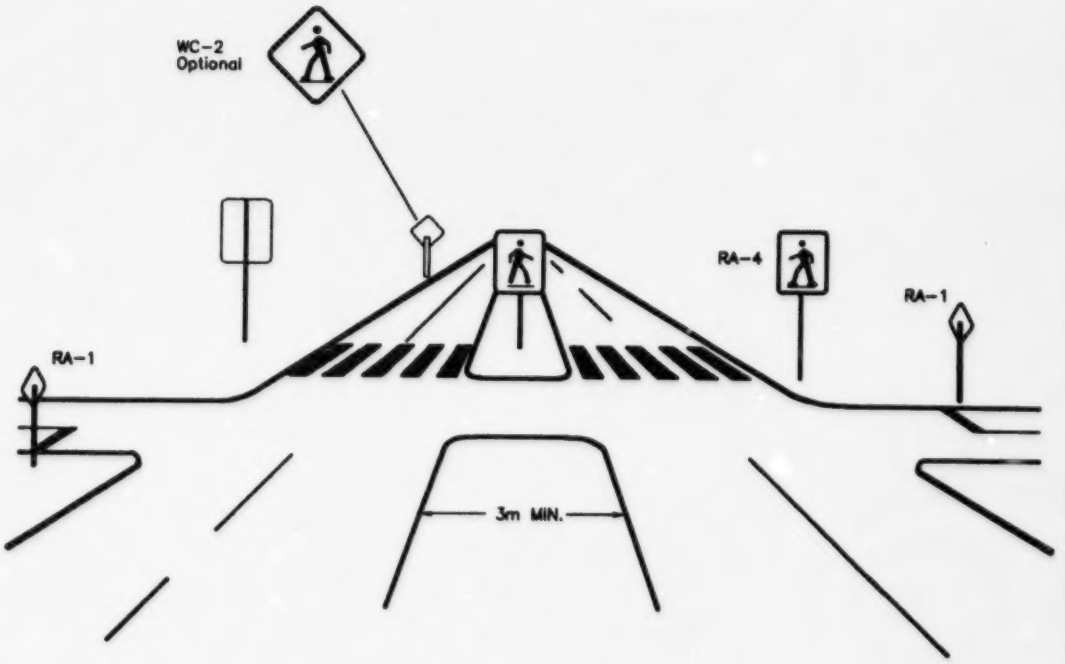




APPROACH SPEED km/h	DIMENSION A: DISTANCE TO THE SIGN AND THE MINIMUM NO PASSING DISTANCE
50	60
60	100
70	120
80	140

FIGURE 2
PEDESTRIAN CROSSWALK
SIDE–MOUNTED SIGNS
(SEE SECTION 1.0 GUIDELINE TEXT)





APPROACH SPEED km/h	DIMENSION A
50	60
60	100
70	120
80	140

FIGURE 2A
PEDESTRIAN CROSSWALK
DIVIDED ROADWAY, SIDE-MOUNTED SIGNS
(SEE SECTION 1.2(g) GUIDELINE TEXT)

2.0 PEDESTRIAN CROSSWALK WITH OVERHEAD-MOUNTED SIGNS

2.1 Application Guidelines

This type of crosswalk should be used when:

a) The crosswalk is not associated with a school route.

b) The roadway has two or more through lanes in each direction or more than three through lanes if the road is one-way.

c) The roadway has a speed limit greater than 60 km/h or high speeds or high volumes.

d) The crossing is mid-block.

e) The crossing serves elderly and handicapped pedestrians who may require a longer crossing time, and the roadway is wider than one through lane in each direction, or more than two through lanes if one-way.

2.2 Description of Installation (Figure No. 3)

a) The appropriate pavement marking is the zebra style crosswalk as described and defined in the Introduction.

b) Pedestrian Crosswalk (RA-4) signs shall be erected over the centre of the approach roadway at the crosswalk location. The pedestrian crosswalk signs should be supported by either overhead davits or cables, and may be mounted back-to-back. The motorists shall face one sign over the right half of the roadway and one over the left half of the roadway. The pedestrian symbol on each sign shall be oriented to face across the approach roadway. Minimum sign size is 60 cm x 75 cm; preferred sign size is 90 cm x 120 cm, especially for higher speed applications.

c) Stopping should be prohibited for a minimum of 30 m on the approaches to the crosswalk.

2.2 Description of Installation (Figure No. 3) (Continued)

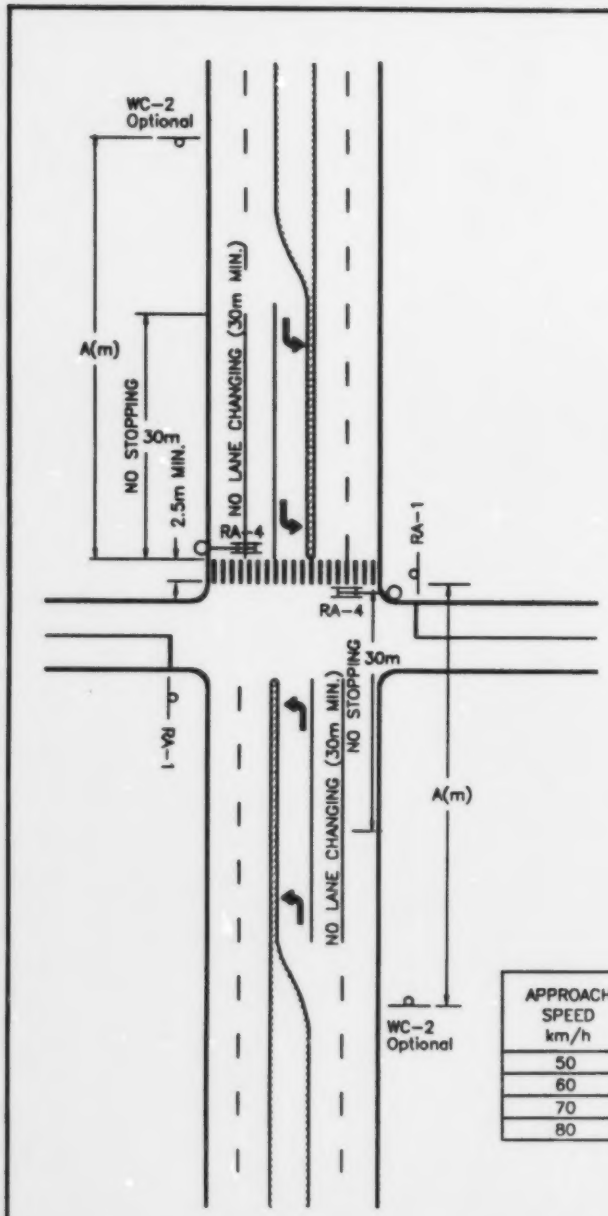
d) Crosswalk visibility should be maximized through location, parking restrictions and vegetation control. Where there is minimum visibility of the crosswalk area, a Pedestrian Crosswalk Ahead sign (WC-2 black-on-yellow warning sign) should be installed in advance of the crosswalk (minimum sign size is 60 cm x 60 cm). The pedestrian symbol shall be oriented to face across the approach roadway. The recommended distance between the crosswalk and the sign depends on approach speed.

e) Solid, white lane lines should be installed on each approach to the crosswalk in order to prohibit lane changing. The recommended length of the solid lane line is 30 m.

f) A supplementary (RA-4) sign may be side mounted on the right side of the roadway. A sign may also be mounted on the left side; if only one additional sign is used, the right side is preferred. The recommended sign size is 60 cm x 75 cm.

g) Where there is a raised median 2.0 m or more in width, such as at some mid-block locations, an alternate signing plan (to that outlined in section (b) above) may be used (Figure No. 3A). A Pedestrian Crosswalk (RA-4) sign shall be erected over the centre of each approach to the crosswalk, oriented to face the approaching traffic. The pedestrian symbol on the sign shall be orientated to face across the approach roadway. Back-to-back overhead signs are not necessary. Minimum overhead sign size is 60 cm x 75 cm; preferred size is 90 cm x 120 cm.

A post-mounted (RA-4) sign (60 cm x 75 cm) shall be placed on the median side of the approach, and be oriented to face the approaching traffic. Back-to-back signs may be used. Thus, a motorist approaching the crosswalk will face one pedestrian crosswalk sign overhead, one on the left hand side of the roadway, and optionally, one on the right (see section (f) above).



APPROACH SPEED km/h	DIMENSION A
50	60
60	100
70	120
80	140

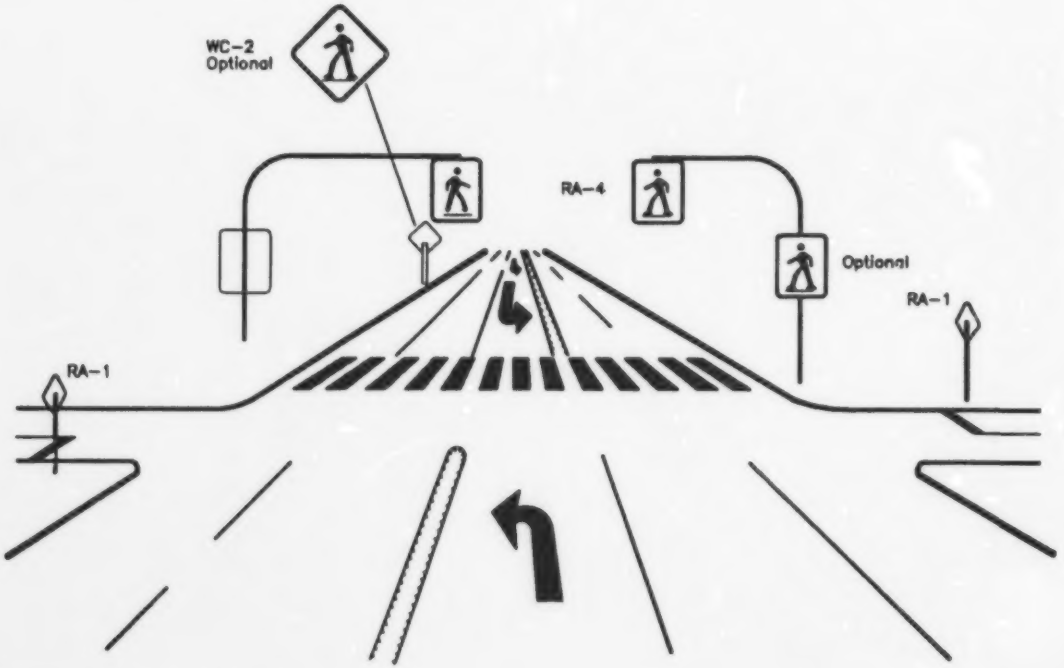
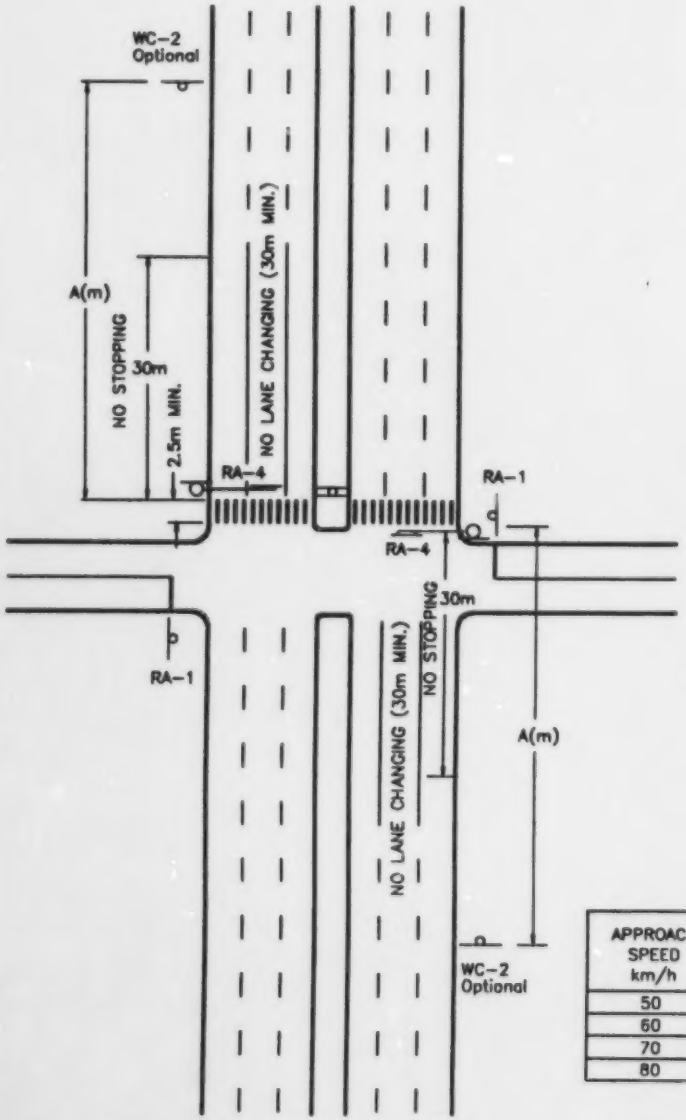
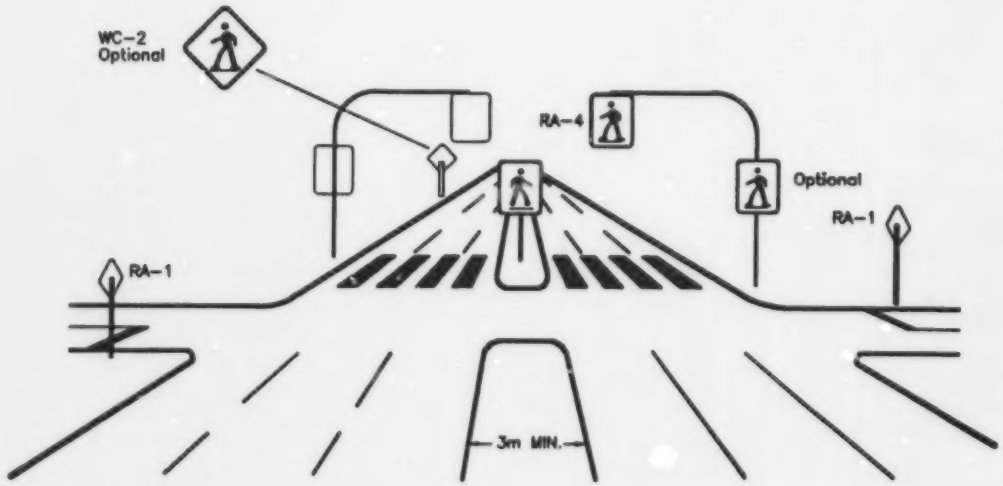


FIGURE 3
PEDESTRIAN CROSSWALK
OVERHEAD-MOUNTED SIGNS
(SEE SECTION 2.0 GUIDELINE TEXT)





APPROACH SPEED km/h	DIMENSION A
50	60
60	100
70	120
80	140

FIGURE 3A
PEDESTRIAN CROSSWALK
DIVIDED ROADWAY
OVERHEAD–MOUNTED SIGNS
(SEE SECTION 2.2(g) GUIDELINE TEXT)

3.0 SCHOOL CROSSWALK WITH SIDE-MOUNTED SIGNS

3.1 Application Guidelines

This type of crosswalk is similar to the "standard crosswalk". For those jurisdictions which distinguish between pedestrian and school crosswalks, the application should be used when:

a) The crosswalk is associated with a school route. These routes should be determined by collaboration between school, police, and municipal representatives. Children should be trained in pedestrian safety.

b) The roadway is not wider than one through lane in each direction or not more than two through lanes if the road is one-way.

c) Traffic volumes are such that sufficient gaps will be available for the children to cross. The British Columbia Ministry of Transportation and Highways' School Crosswalk Curves may be used to assist in determining the most appropriate crosswalk treatment. See Appendix "A".

3.2 Description of Installation (Figure No. 4)

a) Pavement crosswalk markings at school crossings should be of the zebra style.

b) A white "X" (Figure No. 5) should be painted on the roadway in advance of the crosswalk in these applications: high speed roadways, all rural roadways, and where the intersection spacing on a roadway is greater than approximately twice the stopping sight distance.

The recommended distance between the crosswalk and the "X" marking depends on approach speed. The recommended "X" size is 6.0 m x 2.5 m.

c) Post-mounted School Crosswalk (RA-3) signs shall be placed on each side of the roadway and may be mounted back-to-back. The motorist shall face one sign on the right side of the roadway and one sign on the left side of the roadway. The signs show a symbol of two children in black on a white background and shall be a minimum size of 60 cm x 75 cm.

3.2 Description of Installation (Figure No. 4) (Continued)

The children symbol on the sign shall be oriented to face across the approach roadway (RA-3L and RA-3R signs are available).

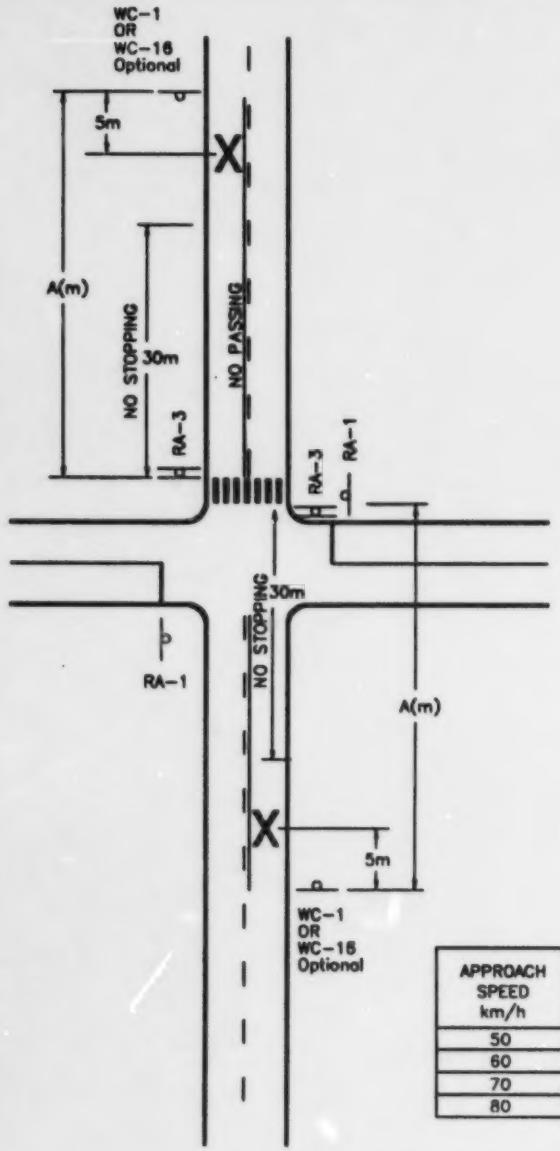
d) A School Crosswalk Ahead warning sign (WC-16) may be used in advance of the crosswalk, except where the School Area warning sign (WC-1) is in place. The recommended distance between the crosswalk and the WC-16 sign depends on approach speed.

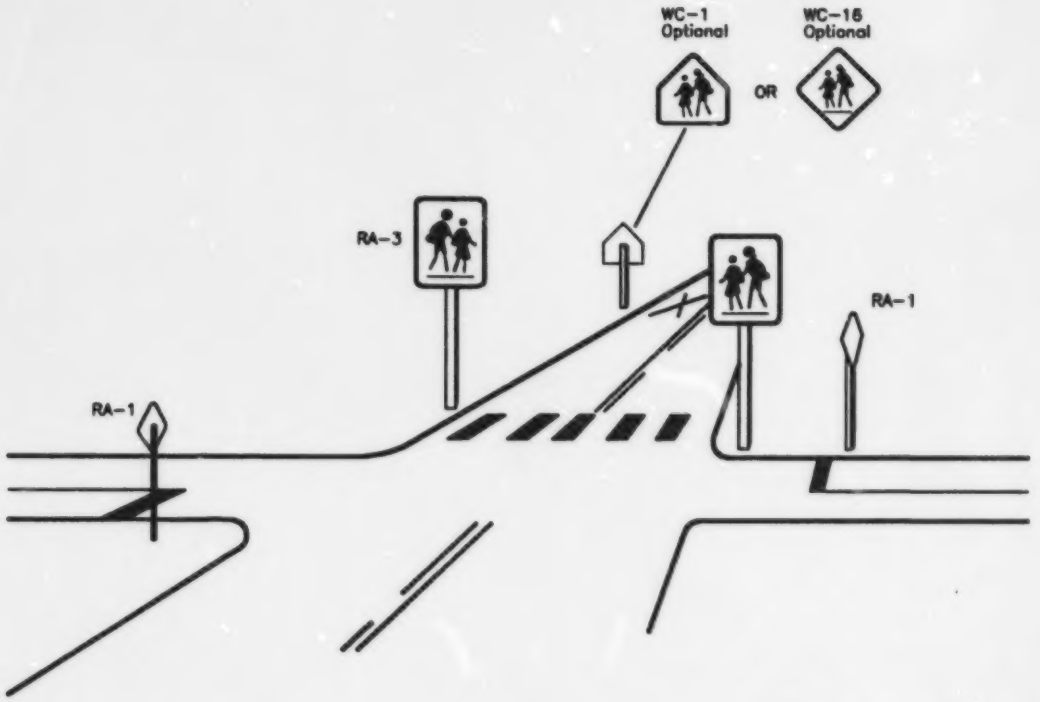
e) The white-on-blue pentagon shaped School Area warning sign (WC-1) may be used as an advance warning sign to indicate that a school is nearby and children may be walking along or crossing the roadway. It need not be associated with a school crosswalk but, when associated with the crosswalk, School Crosswalk Ahead (WC-16) signs should not be used with it.

f) Stopping should be prohibited for a minimum of 30 m on each approach to the crosswalk.

g) On a single lane approach, a passing restriction should be implemented for traffic approaching a crosswalk. Generally, a solid yellow line pavement marking that prohibits passing is adequate and additional signing is not required. Recommended length for the passing restriction is dependent on the approach speed.

h) On multi-lane approaches, solid, white lane lines should be installed on each approach to the crosswalk in order to prohibit lane changing. The recommended length of the solid line is 30 m.





APPROACH SPEED km/h	DIMENSION A: DISTANCE TO THE SIGN AND THE MINIMUM NO PASSING DISTANCE
50	60
60	100
70	120
80	140

FIGURE 4
SCHOOL CROSSWALK
SIDE-MOUNTED SIGNS
(SEE SECTION 3.0 GUIDELINE TEXT)

4.0 SCHOOL CROSSWALK WITH OVERHEAD-MOUNTED SIGNS

4.1 Application Guidelines

For those jurisdictions which distinguish between pedestrian and school crosswalks, this application may be used, during the school year, when:

a) The crosswalk is associated with a school route. These routes should be determined by collaboration between school, police, and municipal representatives. Children should be trained in pedestrian safety.

b) The roadway has two or more through lanes in one or more direction, or on a narrower roadway, where the visibility of post mounted signs is restricted.

c) Traffic volumes are such that sufficient gaps will be available for the school children to cross. The Ministry's School Crosswalk Curves may be used as a guideline. See Appendix "A".

4.2 Description of Installation (Figure No. 6)

a) Pavement crosswalk markings at school crossings should be of the zebra style.

b) A white "X" (Figure No. 5) should be painted on the roadway in advance of the crosswalk in the applications noted below. Recommended size is 6.0 m x 2.5 m. Applications include high speed roadways, all rural roadways, wherever sight distance to the crosswalk is less than the stopping sight distance for wet conditions, and where the intersection spacing on roadway is greater than approximately twice the stopping sight distance. The recommended distance between the crosswalk and the "X" marking depends on approach speed (see Figures No. 4 and 6).

c) School Crosswalk signs (RA-3) shall be erected over the centre of the approach roadway at the crosswalk location. The school crosswalk signs should be supported by either overhead davits or cable and may be mounted back-to-back. The motorist shall face one sign over the right half of the roadway and one over the left half of the roadway. On each sign, the symbol of the children shall be oriented to face across the approach roadway. Minimum sign size is 60 cm x 75 cm; preferred size is 90 cm x 120 cm, especially for high speed roadways.

4.2 Description of Installation (Figure No. 6) (Continued)

d) A School Crosswalk Ahead warning sign (WC-16) may be used in advance of the crosswalk, except where the School Area Warning sign (WC-1) is in place. The recommended distance between the crosswalk and the WC-16 sign depends on approach speed.

e) The white-on-blue pentagon-shaped school area warning sign (WC-1) may be used as an advance warning sign to indicate that a school is nearby and children maybe walking along or crossing the roadway. It need not be associated with a school crosswalk; when associated with a crosswalk, School Crosswalk Ahead signs should not be used.

f) A supplementary (RA-3) sign may be side-mounted on the right side of the roadway. A sign may also be mounted on the left side but, if only one sign is used, the right side is preferred. The recommended sign size is 60 cm x 75 cm.

g) Stopping should be prohibited for a minimum of 30 m on each approach to the crosswalk.

h) Solid, white lane lines should be installed on each approach to the crosswalk in order to prohibit lane changing. The recommended length of the solid line is 30 m.

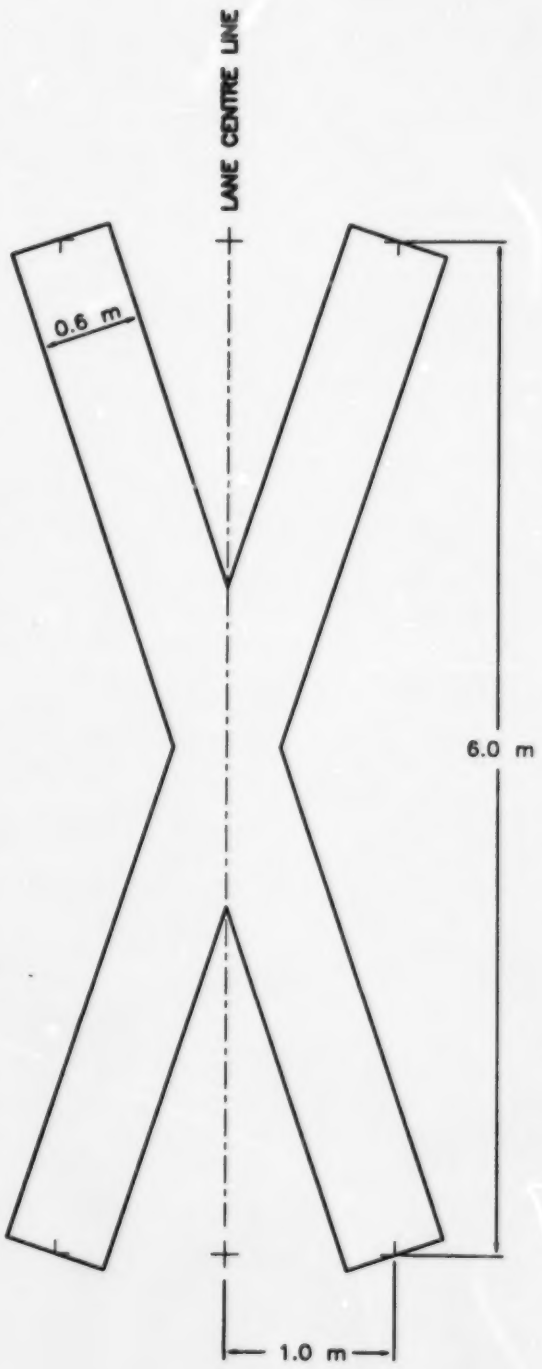
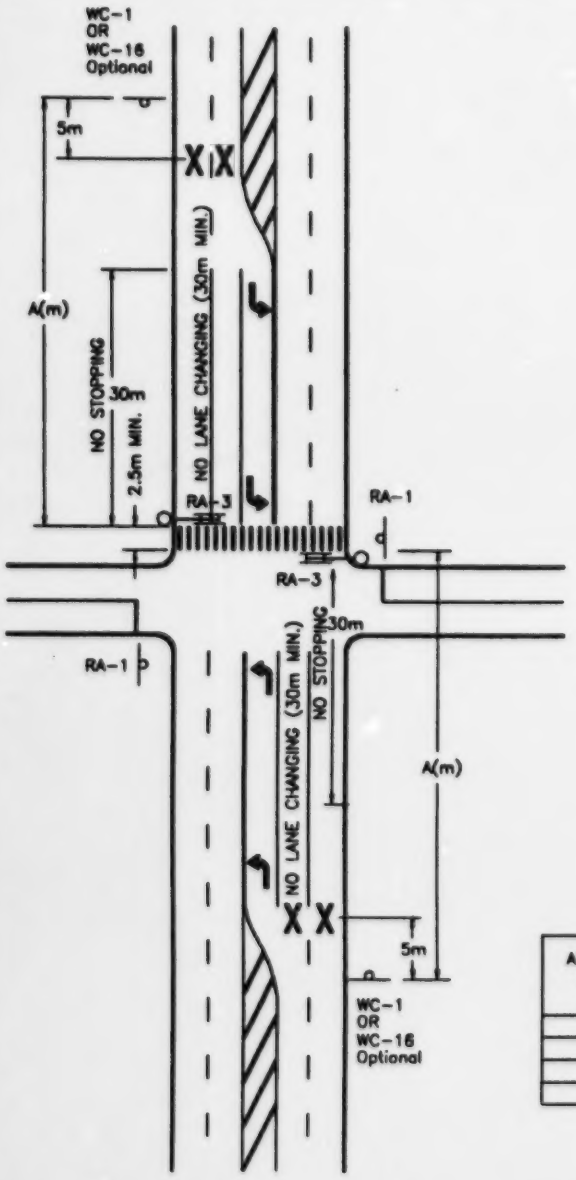
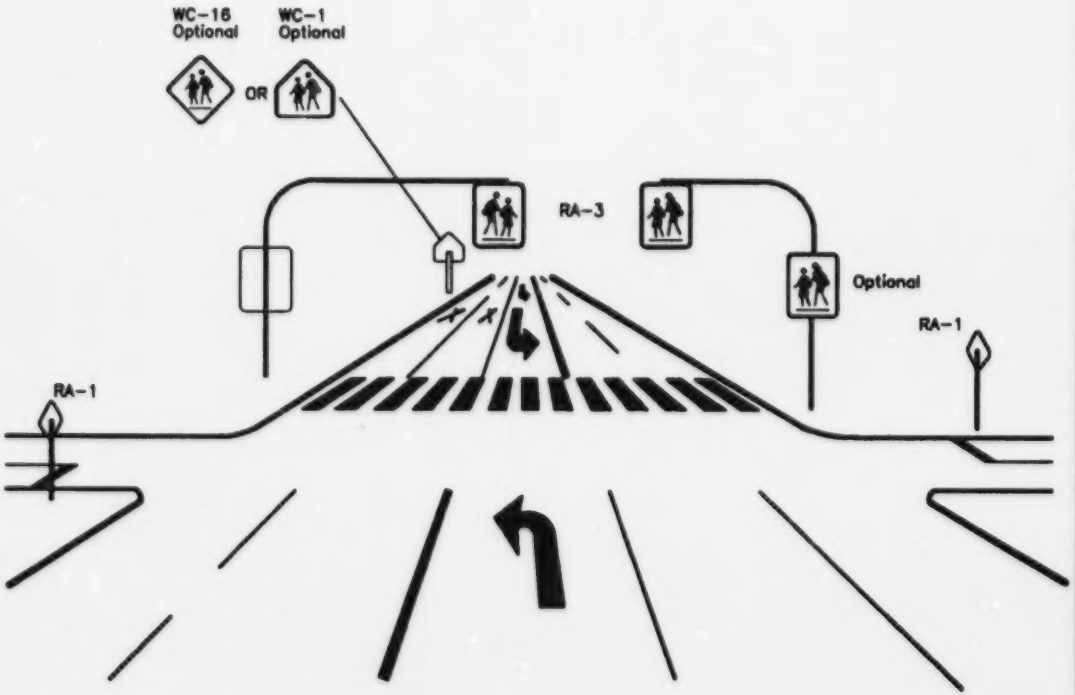


FIGURE 5
ADVANCE 'X' MARKING





APPROACH SPEED km/h	DIMENSION A
50	60
60	100
70	120
80	140

FIGURE 6
SCHOOL CROSSWALK
OVERHEAD-MOUNTED SIGNS
(SEE SECTION 4.0 GUIDELINE TEXT)

5.0 SPECIAL CROSSWALKS

5.1 Application Guidelines

Special crosswalks may be installed at either pedestrian or school crosswalks. They should not be installed under any of the following conditions:

a) The posted speed is greater than 60 km/h.

b) The roadway is greater than three through lanes in each direction for two-way streets or more than four through lanes for one-way streets.

c) The installation would disturb traffic flow at an adjacent traffic control signal or another special crosswalk. A minimum spacing of 200 m from an adjacent traffic control signal is recommended.

d) There are visibility problems.

e) High vehicular volumes are present such that safe gaps do not happen.

5.2 Description of Installation (Figure No. 7)

a) Crosswalk pavement markings should be of the zebra style.

b) Two white-on-black Pedestrian Crosswalk (RA-5) signs shall be mounted overhead per approach. One sign shall be over centre of the right half of the roadway and the other sign shall be over the centre of the left half of the roadway. On each sign, the pedestrian symbol shall be oriented to face across the approach roadway. Minimum sign size is 60 cm x 75 cm.

Each overhead sign shall contain internal illumination, down lighting for the crosswalk area and one flashing yellow beacon (20.0 cm lens).

It is also recommended that 60 cm x 75 cm side-mounted RA-4 signs be installed back-to-back on the shaft of the davit poles.

c) Upon activation by the pedestrian, the two flashing beacons per approach (one per sign) shall flash alternately.

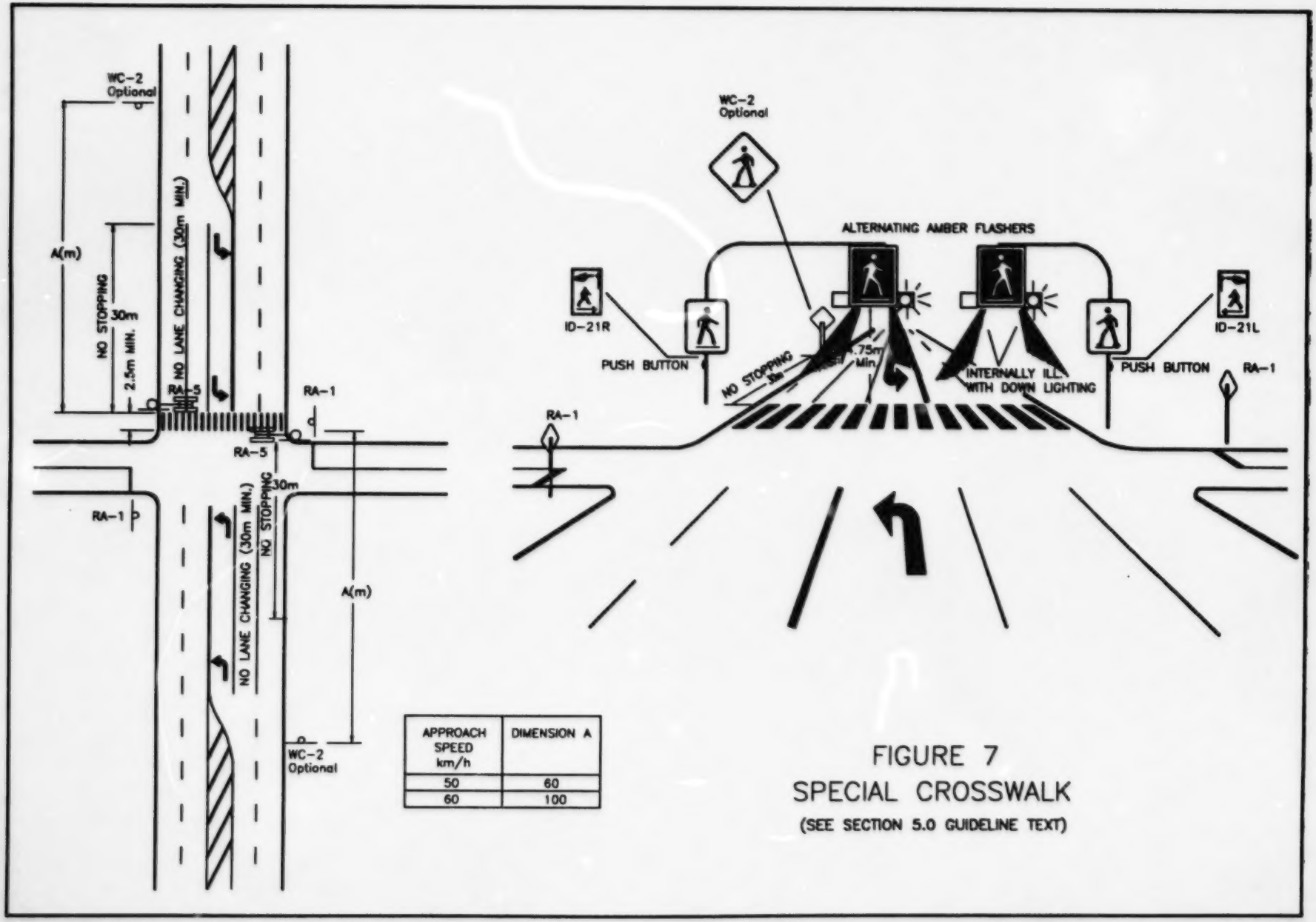
5.2 Description of Installation (Figure No. 7) (Continued)

d) Pedestrian Crosswalk Ahead (WC-2) warning signs should be used where there is minimum visibility of the crosswalk. The recommended distance between the crosswalk and the WC-2 sign depends on approach speed.

e) To improve visibility of pedestrians for motorists, a stopping prohibition, in effect at all times, should be implemented for a minimum 30 m on each approach to the special crosswalk. A stopping prohibition is also recommended for 15 m on the far side of the special crosswalk.

f) On a single lane approach a passing restriction should be implemented for approaching traffic.

g) On multi-lane approaches, solid, white lane lines should be installed on each approach to the crosswalk in order to prohibit lane changing. The recommended length of solid lane line is 30 m.



APPROACH SPEED km/h	DIMENSION A
50	60
60	100

FIGURE 7
SPECIAL CROSSWALK
(SEE SECTION 5.0 GUIDELINE TEXT)

6.0 PEDESTRIAN SIGNAL

6.1 Application Guidelines

This type of crosswalk should only be used when all of the following criteria are met:

a) Pedestrian volumes are high.

b) Less than 60 gaps per hour are available in the vehicular traffic to accommodate the pedestrian demand. The Ministry's Crosswalk Curves may be used as a guideline.

b) The crosswalk location is a minimum of 200 m from an adjacent traffic signal. 400 m minimum is preferred.

c) Traffic volumes do not warrant full vehicular signals.

6.2 Description of Installation (Figure No. 8)

a) Crosswalk pavement markings should be of the zebra style. Advance pavement "X"'s should not be installed.

b) A primary three-section signal head shall be suspended on the far side of the intersection over the right side of the roadway.

c) Standard pedestrian actuated "walk/don't walk" signal heads shall be placed at either end of the crosswalk and oriented to face across the roadway. These heads shall be positioned such that the bottom of the head is not less than 2.5 m or more than 3.0 m above the roadway.

d) A push button for signal actuation should be installed at each end of the crosswalk. These buttons should be located 1.2 m above the ground.

e) The vehicular signal heads should rest in flashing green and the pedestrian heads in solid "don't walk" until the signal is pedestrian activated. The vehicular signals should then change to solid green, and then to a yellow and all red vehicular clearance period. Following the vehicular clearance period, the pedestrian "walk" signal should be displayed, followed by a flashing "don't walk" indication for pedestrian clearance. The signal should then return to the rest mode.

f) Pedestrian signing shall not be used in conjunction with signal control.

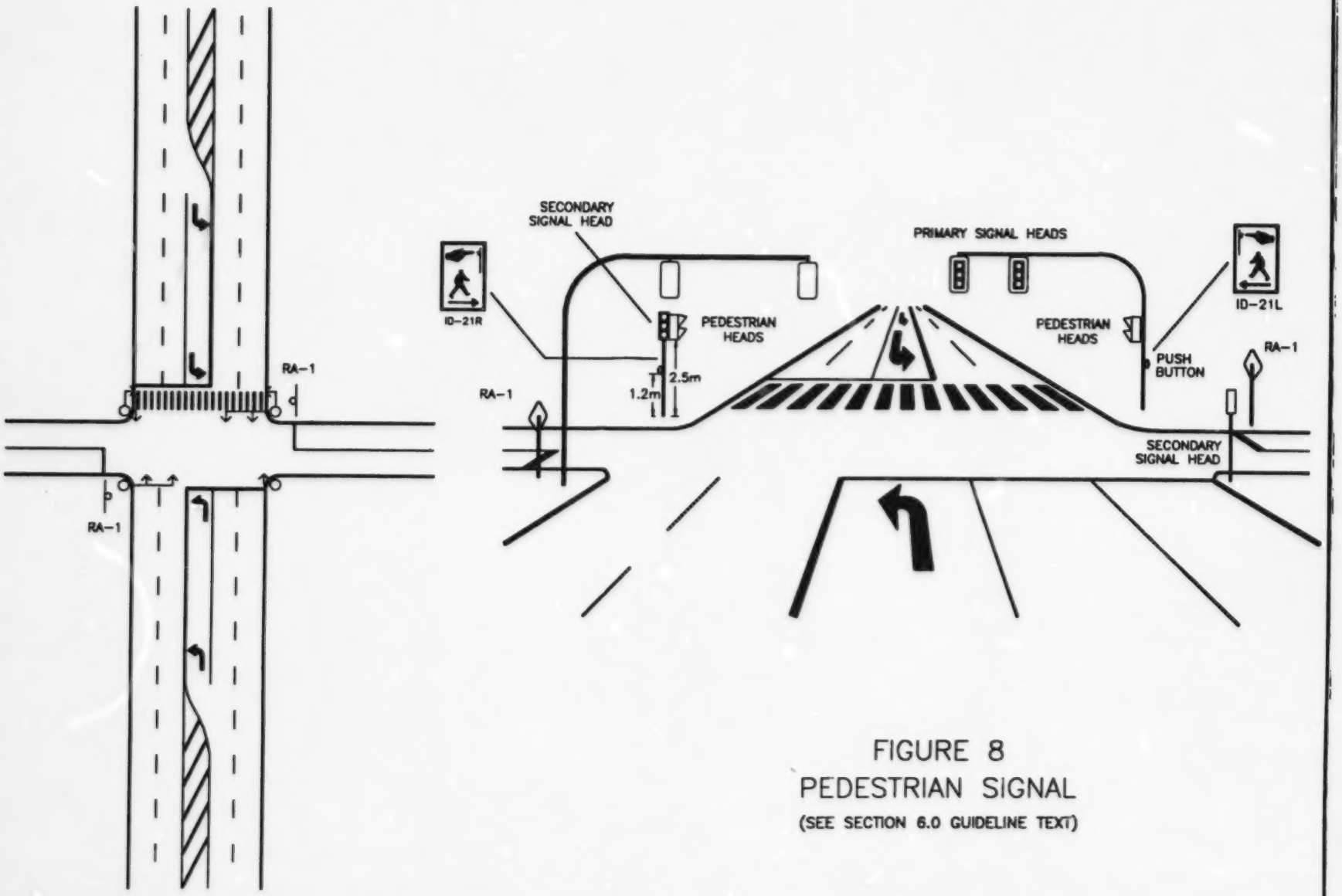


FIGURE 8
PEDESTRIAN SIGNAL
(SEE SECTION 6.0 GUIDELINE TEXT)

APPENDIX "A"
NOTES ON SCHOOL CROSSWALK CURVES[1]

To understand the principle from which the curves are derived, it is necessary to review the sequence of actions taken by a pedestrian about to cross a road. Having chosen a place to cross, the pedestrian looks up and down the road to see if traffic is close by. If there is no traffic, or if it is very far way, the pedestrian will cross the road. However, if traffic is approaching, the pedestrian now has to make a more complicated judgement; taking into account the width of the road to be crossed, and the amount or proximity of the approaching traffic.

The pedestrian, in fact, will attempt to select a safe crossing gap between the approaching vehicles. If the road is narrow and the pedestrian athletic, then a short crossing gap between vehicles will be chosen. If the roadway is wide and the pedestrian infirm, then a much longer gap will be required. Shorter gaps will be rejected by that type of pedestrian who will then be delayed until a safe crossing gap occurs. While walking speeds vary, a value of 1.0 m/second is a conservative value used for children and elderly people.

The time taken to actually cross the roadway is readily found by combining the walking speed of pedestrians and the width of the roadway. A typical example would be a two lane, two way, undivided highway with the width between edge lines of 7.2 m, being walked across by a child pedestrian having a walking speed of 1.0 m/second. The time taken to walk clear across the road would be 7.2 seconds, and this would be the basic safe crossing gap required to walk across that particular roadway between vehicles approaching from both directions. In such circumstances, a pedestrian would have to reject gaps which where, in his judgement, less than 7.2 seconds and would be happy to use gaps which were longer than 7.2 seconds.

The question now arises as to how many safe crossing gaps will occur in a given traffic stream. If the volumes are low, there will be a large number of time gaps, and as the volumes increase, the time gap between vehicles will decrease until eventually there may be almost no gaps of sufficient duration to allow a person to cross a roadway. The length of time gaps varies and the variation is considered to be distributed according to the "Poisson" curve. Use this type of statistical distribution allows us to compute the number of safe time gaps occurring in a traffic flow from the average rate of flow.

It is from the equations linking crossing gap frequency to roadway widths and traffic volumes that the attached curves have been prepared. For convenience, the curves have been drawn so as to show how many crossing opportunities will occur in a hour for a specific width of roadway and it's two-way traffic volume.

From inspection of the graph, it can be seen that a typical two lane roadway having a width of 7.2 m and a total two-way traffic volume of 700 vehicles per hour, should have 120 safe crossing opportunities every hour, or one every 30.0 seconds. However, when the traffic volume is doubled to 1400 vehicles per hour, the number of safe crossing opportunities drops

to 30 per hour, or one safe crossing opportunity every two minutes. If a given two-way traffic volume of, say, 340 vehicles per hour is chosen for a typical three lane highway, it will produce 120 crossing opportunities in the hour; while a volume of 700 vehicles per hour on the same three lane highway would, from inspection, produce about 45 safe crossing opportunities per hour.

The zones between the various curves may be used to select crossing treatments as follows:

ZONE A

The combination of traffic volumes and roadway widths in this zone will normally present few problems, with safe crossing gaps occurring very frequently in the traffic stream, allowing pedestrians to use gaps with little hesitation or delay. When a highway must be crossed as part of the Safety Route to a School, then a school crosswalk should be installed together with its support signing, in accordance with Drawing No. H.S.E. 76.01E. The need for the supervision of the crosswalk should only arise when the youngest school children are using the crosswalk, but children who have completed Grade 1 and received instruction in school pedestrian safety should be able to use the crosswalk with little difficulty.

ZONE B

This represents the situation where safe crossing gaps are occurring every 30.0 to 40.0 seconds. The marked school crosswalk with signs should be sufficient to assist crossing, but the selection of safe crossing gaps requires a little more judgement. School Boards should be advised that a school patrol is recommended to ensure observance of good safety practices by the school children.

ZONE C

The safe gap reduces in frequency to one every 40.0 to 60.0 seconds. This represents a more difficult task for most children and their potential exposure to inconsiderate motorists is increased to a level where the use of adult crossing guards should be recommended to the School Board.

APPENDIX "A" (Continued)
NOTES ON SCHOOL CROSSWALK CURVES[1]

ZONE D

The number of safe crossing gaps is less than that usually available at signalized intersections. This indicates the need to consider a pedestrian operated signal and obviously a careful investigation of all circumstances will be required before a decision is taken. During the consideration of a pedestrian operated signal the School Board should be advised that such a signal will require supervision by some responsible child or adult to ensure its safe use by younger children. Frequently, school authorities believe that installing a pedestrian operated signal will relieve them of the problem of furnishing a crossing supervisor. This is incorrect, and they should be so advised whenever it is opportune.

ZONE E

The conflict between vehicles and pedestrians increases to a point where the pedestrian signal can only be operated by an adult supervisor.

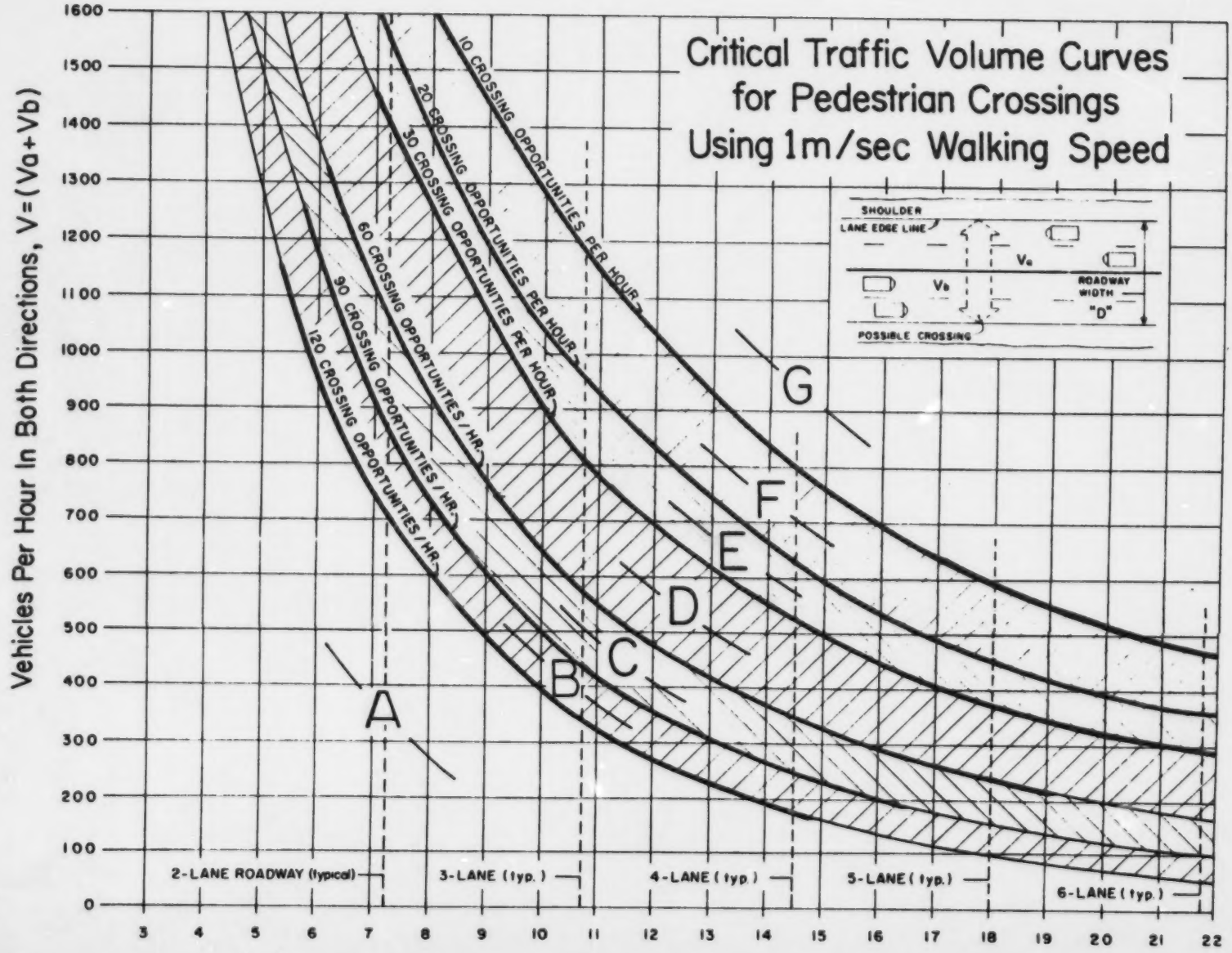
ZONE F

At this level of conflict, the use of a grade separated crossing should be considered for wider roadways of four lanes and up. Again, investigation is needed to determine the amount of pedestrian needs for this work, and Headquarters' Branches may be involved.

ZONE G

There is little doubt that grade separations will be needed at crossings where no alternate routes are feasible.

[1]J. Lisman, P. Eng., Highway Safety Engineer, Ministry of Transportation and Highways, Victoria, British Columbia. Notes on School Crosswalk Curves, December 2, 1981, pp 1-2.


Critical Traffic Volume Curves
for Pedestrian Crossings
Using 1m/sec Walking Speed
Vehicles Per Hour In Both Directions, V=(Va+Vb)
"D," Width Of Roadway Between Opposite Edge Lines, In Metres
10 CROSSING OPPORTUNITIES PER HOUR
20 CROSSING OPPORTUNITIES PER HOUR
30 CROSSING OPPORTUNITIES PER HOUR
60 CROSSING OPPORTUNITIES / HR.
90 CROSSING OPPORTUNITIES / HR.
120 CROSSING OPPORTUNITIES / HR.
A
B
C
D
E
F
G
2-LANE ROADWAY (typical)
3-LANE (typ.)
4-LANE (typ.)
5-LANE (typ.)
6-LANE (typ.)
SHOULDER
LANE EDGE LINE
Va
Vb
ROADWAY WIDTH "D"
POSSIBLE CROSSING